

Control and Modeling of Extensible Continuum Robots

Completed Technology Project (2017 - 2021)



Project Introduction

The goal of this research is to develop fundamental control theory, dynamic modeling, and control technology for extensible continuum robotic manipulators. These systems often resemble snakes, tentacles, or elephant trunks that are able to bend at any point along their backbone, making modeling and control difficult. Current literature contains partial realizations of these goals but have yet to see advances that allow for extensive application of continuum manipulators. The pursuit of these goals will require the application of linear and nonlinear control techniques, Lagrangian mechanics, state estimation techniques, and system feedback manipulation. Achieving these goals will open the door for reliable control of continuum manipulators and permit Space and exploration applications such as whole-arm grasping, sample manipulation, and crevasse exploration.

Anticipated Benefits

This research will open the door for reliable control of continuum manipulators and permit Space and exploration applications such as whole-arm grasping, sample manipulation, and crevasse exploration.

Primary U.S. Work Locations and Key Partners

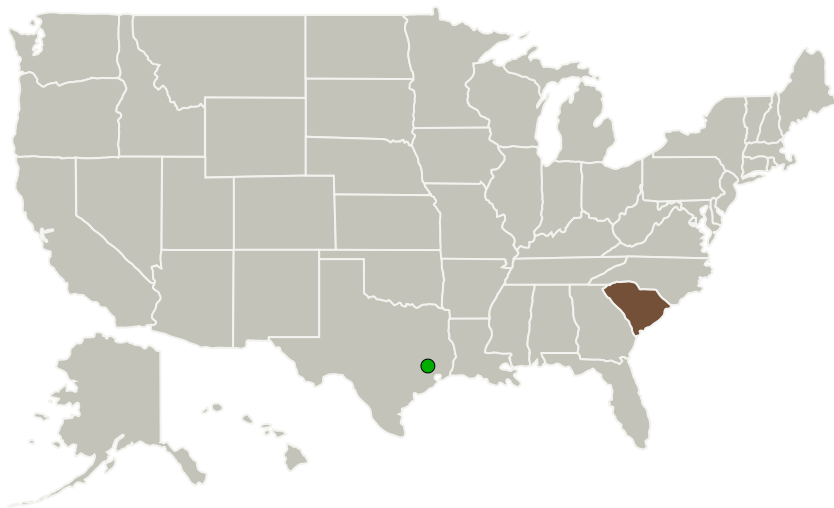
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Organizational
Responsibility**Responsible Mission
Directorate:**Space Technology Mission
Directorate (STMD)**Lead Organization:**

Clemson University

Responsible Program:Space Technology Research
Grants

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Organizations Performing Work	Role	Type	Location
Clemson University	Lead Organization	Academia	Clemson, South Carolina
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations

South Carolina

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

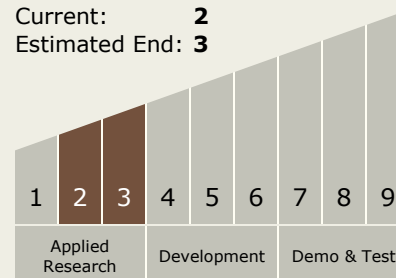
Ian A Walker

Co-Investigator:

Chase G Frazelle

Technology Maturity (TRL)

Start: 2
Current: 2
Estimated End: 3



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.3 Manipulation
 - TX04.3.1 Dexterous Manipulation

Target Destination

Foundational Knowledge